

In vitro study on regeneration of periodontal tissue microvasculature using human dedifferentiated fat cells

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ヒト脱分化脂肪細胞を用いた歯周組織微小血管再生能の検討

清水 豊

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using human dedifferentiated fat cells

SHIMIZU Yutaka

日本歯科大学大学院新潟生命歯学研究科生命歯学専攻

臨床科学系・硬組織歯周治療学分野・歯周機能治療学

指導：佐藤 聡 教授

The Nippon Dental University Graduate School of Life Dentistry at Niigata,
Course of Clinical Science,
Field of Advanced Conservative Dentistry and Periodontology,
Periodontology
Director: Prof. SATO Soh

BACKGROUND: Human dedifferentiated fat cells (HDFATs) may be a new cell type suitable for regenerative therapies. The aim of this study is to assess the potential of HDFATs for vascular regeneration of periodontal tissue. To do this, HDFATs and human gingival endothelial cells (HGECS) were cocultivated, and vascular regeneration was examined in vitro.

METHODS: HDFATs were isolated from subcutaneous adipose tissue, and HGECS were isolated from gingival cells using anti-cluster of differentiation 31 antibody-coated magnetic beads. HDFATs were cocultured with HGECS in microvascular endothelial cell growth medium-2 (EGM-2MV) for 7 days. Expression of endothelial cell (EC) markers, the formation of capillary-like tubes, and the expression of pericyte markers were determined.

RESULTS: HDFATs, cultured in EGM-2MV or cocultured with HGECS, expressed EC markers. HDFATs in both conditions initiated tube formation within 5 hours of seeding and formed extensive capillary-like structures within 12 hours. These structures disintegrated within 24 hours when cells were cultured in EGM-2MV alone, whereas cocultured HDFATs maintained tubes for >24 hours. Cocultured HDFATs significantly increased expression of pericyte markers, a cell type associated with microvasculature.

CONCLUSION: HDFATs possess the ability to express EC markers, and coculture with HGECS promotes differentiation into pericytes involved in the maturation and stabilization of the microvasculature.